Colony of Seychelles.

ANNUAL REPORT

ON

AGRICULTURE AND CROWN LANDS

FOR THE

YEAR 1915.

Published by Command of His Excellency the Governor.

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AGRICULTURE

AND

CROWN LANDS

ANNUAL REPORT

FOR 1915.

I.

EXPENDITURE, RECEIPTS AND SALE OF PRODUCE

		Rs	c.
Sale of Produce	... ...	1,437	90
Royalty on Guano	... ...	7,042	69
Export duty on Guano	...	1,960	00
Rent of Crown Lands	... ...	16,289	50
Total Rs	...	26,730	09
Total expenditure under Agriculture and Crown Lands ... ... Rs	...	11,443	00

II.

CONDITION OF THE GARDEN, STRIKING SPECIES INTRODUCED, FLOWERED AND FRUITED.

Among economic plants a comparatively large space has been devoted to the Palmyrah palm (*Borassus flebelliformis*).

In a country like Seychelles where palms form such a large proportion of the jungle trees it has been decided to introduce palms of economic value from different parts of the world. Palmyrah palms introduced in 1912 have done very well. Seedlings set out in inferior soil where coconuts are handicapped have reached 7 feet 8 inches in 3 years and the largest seedlings have produced 38 leaves during that period of time. Although the palmyrah palm grows slowly, it produces many different articles of consumption and export; it can be planted so closely together that no better plant, I think, could be grown on these soils called "tuffe" where nothing is grown for the present. These spots formerly rendered sterile by erosion following repeated bushfires and cassava cultivation, exhibit a desolate aspect in the Colony where nothing would relieve more the poorer inhabitants than the culture of an economic plant of easy growth producing marketable articles. It is said in S. India and Ceylon that no less than 801 uses have been found from the products of the Palmyrah palm. Among these uses the following are quoted by W. A. Symonds in S. India :

"1. The young white root is dug up when the nut has been about 3 months under ground, and after being well roasted or boiled, is eaten as a vegetable. Sometimes the boiled roots are ground to a kind of flour and eaten with different additaments, such as fish, salt, chillies, onions, mustard and saffron.

"2. The inside of the nuts out of which the sprout has been pulled is eaten as it is, being soft and sweet.

"3. Leafstalks form the palmings of fences and even cross-sticks for the roofs of small houses. Four kinds of fibre are obtained from it, some of these fibres are sold as substitutes for Piassaba fibre.

"4. The leaf is used for thatching.

"5. The flower stalk, both from male and female trees, produces a great amount of sap which is turned into sugar (jaggery) or vinegar.

"6. The fruit is eaten raw or roasted by the poorer classes. It is much used as fodder for cattle, pigs and poultry. The unripe fruit contains a jelly which is most refreshing and wholesome.

"7. The trunk.—Palmyrah wood used as rafters is described as "the first wood in India". These rafters which are exported from Jaffua are said to last 100 years and over."

The following fruit trees were introduced during the year and set out in the new forest :—

Anona cherimoya.
Persea gratissima (Avocados).
Casimiroa edulis.
Psidium aromatica.
Anona squamosa.
Borassus flabelliformis.
Cenarium amboinensis.
„ commune.
„ Luzonicum.
Carica papaya.
Garcinia xanthochymus.
Nephelium lappaceum.
Macadamia ternifolia.

Among other economic and flowering plants :

Kokia rockii.
Dolichos catjang (Cowpeas).
„ lablab.
Pachyrhizus angulatus.
Plectranthus tuberosus.
Lagerstrœmia flos reginæ (White).
Poinciana regia.
Saraca declinata.
Eloncsa virescens.
Terminalia Benfirii.

a collection of rose trees &c, &c.

Coffea excelsa,
„ congensis (Var Chalotii).
„ canephora W. S.

III.

DISTRIBUTION OF INFORMATION ON AGRICULTURAL MATTERS.

Several reports have been published this year, one on a few coconut diseases recently broken out at La Digue Island and ten others on the results of the researches of the Percy Sladen Trust Expeditions in the Indian Ocean. It is proposed to continue summing up for publication in the local paper, the results of the Expedition in question with special reference to the untapped natural resources of this Colony.

Among the reports submitted to His Excellency the Governor the following may be mentioned :—

1. Report on valuation of properties at Anse Boileau.
2. Report on the supposed correlation between black ants (Technomyrmex albipes) and the recent fall in the coconut crop. Abstracts from this report, together with observations on the regular periodicity of small crops alternating with large crops were published in the local paper.
3. Three progress reports on the experimental manuring of vanilla.
4. Report on Praslin Crown Lands (including Round Island, Fond Boffay, Anse Marie Louise, Fond Ferdinand, Fond Azor, Pointe Zanguilles, Pointe Chevalier, Anse Georgette, Anse Kerlan, Savoie, Newcome, Curieuse and Félicité Islands).
5. Report on valuation of properties at Port Glaud and Mamelles.
6. Report on a visit to La Plaine Estate, Port Glaud, with reference to coconut diseases and experimental manuring with whale manure and coconut husks.
7. Report on visit to Silhouette Island in connection with coconut diseases and citrate of lime manufacture.
8. Report on a visit to Barbarons estate in connection with the spread of the Rhinoceros beetle and with the experimental manuring of coconuts with cattle manure, guano and wood ashes.
9. Report on the cost of tapping, curing and exporting rubber in Seychelles. This last report was also published in the local newspaper.

No charge was made by Government for estate visits which took place at the request of the various owners of the properties mentioned.

IV.

PLOTS EXPERIMENTS.

A series of beds were arranged at Morne Blanc estate, 1200 feet elevation, in order to test the various varieties of sweet patatoes so often grown in this Colony at high elevations on worn out and other estates. The soil was quite unsuitable for other crops.

Local name of variety.	Amount of crop	Quality of tubers.
No. 1 Patate Blanc	2 tons per acre	Small white tubers, very good.
No. 2 Patate 40 jours	2.500 kgs per acre.	Very large, red, bad.
No. 3 Patate la laine noire	4.500 „	Red, small, bad.
No. 4 Same as 1	2.300 „	Same as 1.
No. 5 Patate Noire non trailing	2.750 „	Small white, very good.
No. 6 Dominica	2 „	Red, small, bad.
No. 7 Same as 5	1.800 „	Same as 5.
No. 8 Patate raisin	0.750 „	Dark red, good.
No. 9 Same as 6	0.900 „	Same as 6.
No. 10 Same as 8	0.360 „	Same as 8.
No. 11 Dominica thick set	0.250 „	Red, good.
No. 12 Patate grosse liane	0.250 „	„
No. 13 Same as 3	0.200 „	Same as 3.
No. 14 Patate flammand	0.200 „	Large red, pretty good.
No. 15 Same as 2	0.200 „	Same as 2.

The soil on plots 8 to 15 was still inferior and almost sterile. These results show how precarious and variable are sweet potato crops in this Colony in worn out soils on which so many African families are allowed to plant on the Moitié System. At Rs 3.00 per 100 lbs the largest crop represents a gross value of Rs 270.00 per acre and the smallest Rs 12.00. It is clear that the second type of soil should not be devoted to sweet potatoes as the labour involved in cleaning, planting, weeding and cropping amount to about Rs 35.00. It is also too risky to allow the soil on slopes to become exposed to complete erosion for a crop often worth less than Rs 30.

At the Botanic Station two manured beds were arranged to test the two varieties most commonly cultivated with the following results:—

Patate Blanc 7 tons per acre.
Patate 40 jours 3½ tons per acre.

In both cases Patate blanc seems to be by far the best variety under cultivation in the Colony. Like most trailing varieties it gives several crops in succession, the first crop being obtained from the main stem and the others in succession from the trailing branches which take root at each joint. The name Patate 40 jours is a misnomer. Local planters understand by this name that in the variety in question the tubers begin to set 40 days after planting, a feature which is far from being uncommon with other varieties. The crop of the greatest number of local varieties comes to maturity in 5 to 7 months, according to soil and climatic conditions.

A series of plots were also arranged to test the yield of different varieties of Cassava at the Botanic Station but the experiments were upset by the great amount of pilfering which took place by the labourers and others.

1. Manioc Allemand.—A variety introduced from Ceylon in 1911 with red stems and tubers, not unlike "manioc droit", gave the best yield in manured plots but the yield of about 100 tons per acre was closely followed by that of—

2. Manioc Singapore newly introduced from Ceylon which should be preferred to the preceeding variety owing to its crop coming to maturity 6 months earlier. With cassava as with other plants propagated from cuttings newly introduced varieties yield better.

The other varieties which gave lower yields were the following:—

3. Manioc bleu, a supposed seedling with light coloured tubers obtained from the old Singapore variety.

4. Manioc parasol, not unlike manioc droit which has reddish stems; but the former unlike the latter, branches a few feet from the ground. Manioc droit, with red stems and tubers, is disappearing from the Colony.

5. Manioc Zoe a light coloured variety both as regards foliage and tubers not unlike Singapore in colour.

METEOROLOGICAL OBSERVATIONS.

In 1912 the total rainfall amounted to 106 inches and was the highest on record for a period of 8 years. In 1913 the rainfall reached 85 inches only, but in 1914 it rose to 121.58 inches and was by far the highest on record for a period of 10 years. In 1915 the rainfall was still higher and amounted to 133 inches at the Botanic Station. No higher rainfall was ever recorded at the Botanic Station which was created 15 years ago. In the month of February as much as 30 inches were recorded in 1915.

This heavy rainfall was detrimental to vanilla flowering except on the hills where vanilla is accustomed to heavy showers and permanent moisture. Coconut trees, rubber, bananas, plants yielding perfume and fruit trees benefited very much in their growth, but coconut and fruit trees on which the prosperity of this Colony depends, seemed as in 1914, to have suffered from insufficient pollination of their flowers, the rains washing away the pollen grains from the stigmas nearly all the year round. Vanilla flowering seemed promising until September but the plants which were vigorously growing at the time of the first flowering were checked by a short spell of very dry weather. This caused the dropping of the remains of the flowers which ought to keep at the end of the pods until they have finished growing. Before the vines had finished flowering a second and new flowering appeared and this second flowering got enough rain for the normal development of the pods. On this second flowering the crop of vanilla for 1916 will depend. The first flowering will produce undeveloped pods only. It is the first time for a great number of years that the influence of a short spell of dry weather has been so much in evidence. This is due, no doubt, to the long rainy weather which was experienced for a long time and which caused the roots of the vine to develop abundantly near the surface of the ground in which position they soon get withered and scorched by the sun in very dry weather. The roots were unable, under this condition, to supply the water required for the normal development of the pods.

Meteorological Observations

Temperature			Hygrometer			Rainfall		Rainfall from June to June.			
Daily average per mensem	Maximum	Minimum	Wet Bulb	Dry Bulb	Humidity	Total monthly	No. of rainy dys	Months	1913–14	1914–15	1915–16
January	86.0	71.0	74.0	82.0	84	18.54	14	June	8.24	3.50	2.42
February	84.7	74.2	78.9	84.1	83	30.38	13	July	7.72	1.11	1.40
March	86.4	73.3	81.9	89.7	79	7.75	10	August	3.80	1.24	3.55
April	90.9	74.4	83.6	86.8	79	13.12	11	September	0.71	12.25	22.27
May	83.0	71.9	76.9	80.2	79	4.86	9	October	2.10	13.70	10.82
June	89.6	72.3	79.6	83.5	77	2.42	9	November	9.79	10.93	10.98
July	86.4	84.3	77.6	83.6	74	1.40	3	December	20.26	12.68	7.07
August	85.2	75.8	75.0	81.0	76	3.55	9	January	18.77	18.54	
September	83.6	70.0	74.6	80.3	80	22.27	15	February	6.61	30.38	
October	87.6	73.3	77.0	85.6	80	10.82	11	March	19.26	7.75	
November	81.8	73.1	78.3	82.2	77	10.98	10	April	12.01	13.12	
December	85.4	70.1	75.6	78.3	83	9.07	10	May	9.52	4.86	
	85.8	73.6	77.7	83.1	79	135.16	124		118.77	130.06	

COCONUT INDUSTRIES.

The increase in the coconut crop for the year 1914 was not repeated in the year 1915 and the reduction in the crop for the year under review is so large that much apprehension was felt in the Colony. The crop for 1915 is about the same as that for 1913. The crop for 1914 was larger by about 5 million nuts. This is a great reduction indeed.

There are unfortunately very few estates on which the records of the crops are carefully kept year by year and the amount of information at my disposal tends to show that the reduction was worse on worn out estates and negligible on estates on which the soil is rich. The crop for 1915 on a few of these latter estates is even larger than in 1914. Leaving aside these rich estates which form the exception in the Colony it is not easy to explain in a few words the cause of the reduction on the other estates.

I do not think external factors, such as climate, insect pests, prolificity of the variety cultivated, excessive rains, &c., can be invoked. There is one internal factor which is often lost sight of and which has probably showed its influence this year. I mean a period of under bearing following a period of over bearing which is common to all fruit trees cultivated either in temperate or in tropical countries. The crop for 1914 was a very large one and the coconut trees being unmanured, the balance in the physiological conditions of trees was upset. This should induce planters to manure their trees carefully if they want to avoid waves of depression in their crops.

Normally the crop is reduced from January to May by the fall of immature nuts. The same trees recover however in June and produce maximum crops in October. It is probable that climate factors such as heavy rainfall has something to do with the dropping of immature nuts which are not properly pollinated during heavy showers of rain. But the regular periodicity in the falling of immature nuts shows that coconut palms are disturbed by periods of different vegetative activity which react on the crops.

I had a few young trees put under observations all the year round and obtained the annexed tabulated statement showing results in the flowering and bearing powers of each individual tree.

The flowering is more frequent and the shedding of immature nuts less frequent in March and October and these two periods correspond to periods of greater vegetative activity. In order to show that the influence of the climate should not be overstated it is interesting to point out that these periods of vegetative activity and greater production are the same in widely different countries, as far as climatic factors are concerned. In Ceylon, for example, the rainfall is very heavy in May and short in February while in Seychelles it is quite the reverse, although the crops are much heavier in May in the two countries. It is difficult to avoid thinking that under these circumstances there is some internal or physiological factor which governs the flowering and bearing powers of coconut palms, independently of the more obvious external factors. These palms seem to contract the habit of flowering and fruiting more abundantly at certain periods of their growth and certain varieties are known to produce large crops at longer intervals : such as a variety of the King's coconut in Ceylon which produces only one crop in two years, in spite of all artificial measures adopted to make them fruit more frequently. The tree No 1 in our list is a King coconut from Java and its periodical flowering is also interrupted by long periods of rest.

There is only one way to get out of the difficulty of shortage of crops and that is manuring. The fruiting of a tree is, after all, dependent on the quantity and quality of the food placed at its disposal, but it is a mistake to think that one can get rid of the habit contracted by the palms for generations of flowering periodically and for this reason alone the selection of varieties seems to be of paramount importance. There is no plant which has been more left to itself in the past than the coconut. I gathered on one island, in May last, the following very different varieties of nuts from trees growing on the same piece of ground, within a short distance of each other.

When one thinks that not only is the value of a tree influenced by the number, size and quality of the nuts produced but also by its inherent power of producing the largest number of female flowers at the shortest periodical interval, one can measure the importance of selection in Seychelles. The owner of Silhouette Island showed me three coconut palms, growing in his yard, which had been set out 6 years ago by his friends and by himself in order to test which tree would flower first, from three nuts taken at random from the same tree and even from the same bunch. These three trees, which are now in bearing, produce very different nuts, some nuts are oblong in one tree and round in the other while on the third tree intermediate nuts are short stalked instead of hanging down as in the two others. Such a wide variation can only have been produced by a great variability in the pollination of the mother plant by its numerous neighbours which are of different types. This variation is in the way of selecting good varieties but there is no reason why the selection should not commence on estates which are not likely to change hands. With this end in view, it is proposed, on Government land, to interplant trees selected for their large nuts although short in the number of female flowers, such as Ceylon varieties, together with local strains of known type such as the Coco raisin which produce such a great number of female flowers that sometimes as many as 50 nuts are counted in one bunch.

Variations in the yield of copra per 1000 nuts are also being recorded, from widely different localities, in order to be able to classify the trees growing in all parts of Seychelles according to their merit. This, in future, will also be materially of great assistance in the work of selection.

It is not however to be denied that there are a certain number of parasitic diseases which damage coconut palms in many localities and which are instrumental in keeping down the crops. I can mention, with reference to these parasitic diseases investigated during the year, that the stem bleeding disease caused by a fungus (Thievalopsis Ethacetious) is far from being kept under control. As an example I can quote an estate newly purchased by the Crown for the Wireless Station on which for the requirements of the work it was necessary to cut down full grown coconut palms of all ages. Fully 50o/o of the trees cut down were found to be attacked by the disease in question with the result that the stem were rotten for several feet of their length. Trees younger than 20 years were those which were more seriously diseased. It cannot be doubtful that the bearing power of such trees is reduced to a minimum and that they serve as breeding grounds for the transmission of the disease to other estates.

The abundant rains registered for the last few years caused tall weeds to grow beyond control on a few estates, on which I found, in many cases, the bases of the stems to be entirely decomposed both by the stem bleeding disease and by the attacks of the Melitomma beetles. The trees were so diseased that many of them died out from the supply of water being cut off from the roots. In these cases the palms seemed to suffer from a root disease and they were suffering so much from the shortage of the water supply to their crowns, that the higher parts of the stems, although sound, were considerably reduced in size and shrunken.

In one case, several palms died out from a disease suggestive of the bud rot disease, which attacks coconuts all over the world and Palmyrah palms in India. Many symptoms of the disease which has so often been described, were present but the trees examined had been suffering for such a long time that definite investigations were made impossible. These trees have been cut down and burnt and their neighbours have been placed under observation. In that locality, the Rhinoceros beetles, were very common as they are on all estates where rubbish and distillery refuse accumulate.

On the same estate, a tree was found suffering from the little leaf disease but that tree was not handicapped to a great extent by it, as only one whorl of leaves was attacked, the preceeding and succeeding whorls being very healthy. I noticed, in some cases, that the peculiar appearance of the little leaf disease, which is the shortage and curling of the leaflets, was due to mechanical causes on palms other than the coconut. In

one case the crown of an oil palm had been nearly blown down and the growing shoots formed, for about 6 months, an angle with the vertical. The crown of the tree was a little bent down. The angle which was about 45" after the accident decreased regularly after the development of each new leaflet. When the heart leaf reached the vertical it was found that the whorl of leaves which appeared at the time of the accident reproduced exactly the appearance of the little leaf disease. It may be that a special organism, to which the little leaf disease is due, was introduced into the soft tissues of the heart leaves at the time of the accident.

This long series of diseases goes to show to what extent the necessity of manuring is becoming imperative. Trees manured and freed from parasitic organisms are alone in a position to resist most of these diseases. Only a few planters are grasping the difficult situation and have started manuring with whale manure and coconut husks in some cases and with cattle manure, guano and ashes in others. Green manuring, employed to prevent the formation of a hard pan in calcareous soils, has also been recommended to them.

It is unfortunate that planters do not destroy by burning those parts of their plantations which were badly set out and are now diseased beyond control and renew such plantations. This would save them much trouble in the future.

The Coconut Industries.

THE FOLLOWING NUMBER OF NUTS WERE GATHERED IN 1915 AS COMPARED WITH THE CROPS FOR 1912 TO 1914.

	1912	1913	1914	1915
Nuts exported in nature...	182,227	103,350	173,102	200,673
„ converted into oil	698,400	534,325	795,190	674,468
„ „ coprah	19,153,393	20,946,485	25,805,781	20,439,356
„ „ soap	839,104	452,046	346,612	445,445
„ consumed locally	4,000,000	4,000,000	4,000,000	4,000,000
TOTALS ...	24,873,124	26,036,206	31,120,685	25,759,942

TABULATED STATEMENT SHOWING PERIODICITY IN THE FLOWERING OF COCONUT PALMS.

No. of Tree.	No. of female flowers.	Date of flowering.	No. of nuts remaining.	No. of Tree.	No. of female flowers.	Date of flowering.	No. of nuts remaining.
1	4	March	2	6	9	January	1
1	2	April	1	6	11	February	5
1	1	July	0	6	17	March	6
2	12	January	4	6	10	April	8
2	12	February	1	6	6	May	4
2	12	March	6	6	9	June	1
2	8	April	5	6	6	July	1
2	14	May	5	6	3	November	*
2	14	June	0	6	2	December	*
2	4	October	2	7	5	January	1
2	5	July	0	7	5	February	1
3	1	March	1	7	6	March	4
3	7	March	1	7	8	March	3
3	4	April	1	7	8	April	0
3	4	April	4	7	4	June	0
3	6	June	0	7	3	July	0
3	9	July	0	7	5	September	0
3	4	October	*	7	3	November	*
3	3	December	*	7	3	December	*
4	not in bearing			8	4	February	3
5	9	March	5	8	10	March	6
5	6	March	1	8	10	March	2
5	10	April	9	8	10	May	10
5	10	April	9	8	8	June	0
5	16	June	7	9	6	January	3
5	18	June	7	9	7	February	1
5	12	July	0	9	6	March	2
5	11	August	4	9	5	April	5
5	7	September	1	9	3	May	3
				9	4	June	0
				9	3	July	0
				9	5	September	1
				9	2	October	0
				9	1	November	0
				9	4	December	0

* Means nuts which have not been saved as yet.

	Raisin from Machabée	Raisin from Grand Anse	Raisin from Pointe au Sel	No. 1 from Félicité	No. 2 Ceylon from Félicité	No. 3 from Félicité	No. 4 from Félicité
Length of husk ...	30 cm	21 cm	29 cm	25½ cm	28 cm	28 cm	30 cm
Circumference of husk...	46 „	35 „	43 „	46 „	56 „	51 „	55 „
Length of nut	15 „	13 „	9 „	16 „	16 „	11 „	11 „
Circumference of nut ...	30 „	26 „	26 „	43 „	42 „	32 „	32 „
Thickness of meat ...	15 mm	15 mm	15 mm	15 mm	15 mm	15½ mm	15 mm
Weight of meat ...	250 grs	150 grs	240 grs	450 grs	325 grs	250 grs	320 grs
Weight of shell ...	150 „	100 „	120 „	125 „	115 „	150 „	180 „
Weight of nut unhusked	1 kg 00	650 „	875 „	1k 200 „	1k 240 „	950 „	1k 100 „
Weight of nut husked	420 grs	270 „	410 „	595 „	615 „	5?0 „	600 „

	No. 5 from Félicité	No. 6 from Félicité	No. 7 From Félicité	No. 8 from Félicité	No. 9 from Félicité	No. 10 from Félicité	No. 11 Crossed Red (Nicobar). from Plaisance
Length of husk ...	29 cm	29 cm	25⅓ cm	28 cm	30 cm	30 cm	23½ cm
Circumference of husk...	56 „	50 „	38 „	50 „	51 „	53 „	57 „
Length of nut ...	17 „	17 „	17½ „	15 „	21 „	17 „	16 „
Circumference of nut ...	30 „	25⅓ „	25½ „	28 „	30 „	30 „	53 „
Thickness of meat ...	15 mm	14½ mm	16 mm	14 mm	14 mm	14 mm	16 mm
Weight of meat ...	249 grs	240 grs	245 grs	250 grs	275 grs	250 grs	300 grs
Weight of shell ...	150 „	125 „	125 „	150 „	125 „	150 „	150 „
Weight of nut unhusked	1k 200 „	800 „	600 „	700 „	700 „	950 „	1k 150 „
Weight of nut husked	400 „	375 „	375 „	415 „	410 „	415 „	470 „

	No. 1 from North Id.	No. 2 from North Id.	No. 14 Ceylon from Botanic Station	No. 15 Ceylon from Botanic Station	No. 16 Ceylon from Botanic Station	Java	
Length of husk ...	28 cm	30 cm	33 cm	25 cm	23 cm	32 cm	
Circumference of husk...	61 „	38½ „	63 „	54 „	51 „	63 „	
Length of nut ...	17 „	20 „	15 „	17 „	18 „	24 „	
Circumference of nut ...	39½ „	43 „	38 „	37 „	39 „	48 „	
Thickness of meat ...	13 mm	14 mm	15 mm	16 mm	14 mm	15 mm	
Weight of meat ...	500 grs	500 grs	425 grs	400 grs	470 grs	700 grs	
Weight of shell ...	300 „	125 „	250 „	200 „	235 „	235 „	
Weight of nut ...	1k 300 „	1k 800 „	1k 500 „	1k 300 „	1k 600 „	1k 950 „	

VANILLA INDUSTRY.

The crop of vanilla for 1915 amounted to 2½ tons only and is the lowest on record since 1895. It can be said that no good vanilla crop has been obtained for the last eight years to the great prejudice of the up country planters. The small crop under review is due to the bad distribution of the rain during 1914; no dry weather having been experienced of sufficient duration to promote a good flowering. There was a dry spell in August but heavy rains fell in September, just at the wrong moment; so the vines put forth new growth instead of flowering. The same can be said of this year's flowering (1915) but a second spell of dry weather, although of short duration, was experienced after the vines had opened their flower buds with the result that a second flowering took place after the first and a corresponding increase is anticipated for the future crop. On the hills of Mahé and in Praslin District a small average crop of about 15 tons will probably be obtained in 1916. The price will also be better next year, as it is reported that in Mexico and the West Indies hurricanes caused the destruction of a large part of the crop for 1916.

A prolonged period of heavy rains has kept vanilla growing well for the last 3 years and better crops are anticipated in the future. It must however be confessed that although the disease which was prevalent last year seems to have made no progress and can be made good by care and attention, vanilla does not grow as vigorously in Seychelles as formerly. This is due to want of manuring and also to the absence of humus from most soils in which this substance was found in abundance in ancient times. More attention has been devoted to coconut planting for the last 8 years and the humus forming material, which formerly accumulated in these coconut plantations, is no longer to be found. Vanilla then was interplanted with coconuts and benefited largely from the humus derived from the trees, bushes and shrubs used as props. The tendency is now to keep coconut plantations free from foreign trees and to devote poorer soils to vanilla plantations, outside the "cocoteries". This is agriculturally a better policy but it is clear that vanilla, for this reason, has to be manured more extensively than formerly.

The experiments on the manuring of vanilla have been continued and at the end of the year the following plots had been arranged and manured :—

No. of bed.	Treatment.	No. of times manured.
1.	Control	...
2.	Leguminous mulch	1
3.	Ordinary mulch	1
4.	Lime (2 lbs to each vine)	1
5.	Phosphate (5 lbs to each vine)	1
6.	Complete Fertilizer Truffaut (200 lb of soil cont : 2 o/o fertilizer) ...	1
7.	Complete Soluble applied in solutions of 0.5 o/oo	9
8.	Potassium Sulphate „ „	9
9.	Potassium Chloride „ „	9
10.	Ammonium Nitrate „ „	9
11.	Sodium Nitrate „ „	9
12.	Complete Fertilizer Truffaut (200 lb of soil cont : 2 o/o fertilizer) ...	9
13.	Control	...
14.	Potassium Phosphate, Ammonium Nitrate and lime. Applied in solutions of 0.5 o/oo except lime which is applied as coral.	9
15.	Potassium Phosphate, Ammonium Nitrate without lime. Applied in solutions as above	9
16.	Potassium Phophate and lime. Applied in solution except lime which is applied as coral	9
17.	Ammonium Nitrate, Potassium Chloride and lime. Applied in solution except lime which is applied as coral	9
18.	Ammonium Nitrate, Rock guano and coral	9
19.	Sea weed (200 lbs)	1
20.	Whale manure and sea weed	1
21.	Coconut husk (200 lbs)	1
22.	Complete fertilizers (200 lbs) of fern roots containing 2 o/o fertilizer ...	1
23.	„ (200 lbs) „ „ ...	1
24.	„ (200 lbs) „ „ ...	1
25.	„ (200 lbs) „ „ ...	1

All chemical manures are employed at the rate of 14 litres of solution per vanilla vine.

Two series of plots have thus been added to last year's experiments.

1. Plots 14 to 25—Parts of these were set out with cuttings from productive vines and the rest planted with cuttings from vines which had never flowered. This was done in order to ascertain whether the great number of vines which never flower, in a given vanillery, are tainted or not with hereditary characters and whether consequently the selection of cuttings should be made from vines of known productivity.

2. Plots 27 to 32—Have also been set out and it is proposed to devote them to the study of the influence of different weeds on the growth of vanilla, independently of other treatment. It is the rule, on all estates, to allow grasses to grow at the foot of vanilla vines and to cutlass the weeds, once, two or three times a year without uprooting them. As the same species of grass are not uniformly adopted on all estates, the new experiments now on hand will serve to show what weeds are less injurious or more beneficial. There is no doubt that weeds evaporate a large amount of moisture from the ground—(a blade of grass evaporating its own weight of water in one hour)—but the delicate vanilla roots must be protected from the rays of the sun and it is the cooling action of the weeds which is looked for, in spite of evaporation of the water from the soil. The question is however to find out by experiment what are the best grasses to be employed, both as regards the cooling action on the soil and the least interference with the roots and food of vanilla.

In the experimental field, much trouble has been given by the roots of the shade trees (Albizzia moluccana and Parkia roxburghii) which accumulated in the ground near the vanilla roots and rendered the soil rootbound to the great prejudice of the orchid. As it would be a great pity to cut down these beautiful trees, which are 7 to 8 feet in girth, trenches have to be dug round the beds to get rid of the intervening roots which have also to be forked out inside the beds at regular intervals. The influence of some peculiar shade trees on the growth of vanilla has never been more clearly demonstrated than in the vanilla beds in question. These experiments show with what care shade trees for vanilla have to be selected. All large trees such as Parkias and Albizzias throw out a considerable number of rootlets, when manures are applied in the solid state to vanilla grown in their shade; other trees such as Gliricidia maculata, used in some of the experimental plots as a prop, have not produced abundant rootlets on the surface, as in the case of Albizzia. There is every reason to believe that this small tree can advantageously replace all the other props employed hitherto in the culture of the orchid. Their powerful vegetation does not in the least hinder the growth of the vanilla vines and there is nothing to show as yet, after 15 months' trial, that, as a consequence of a great vegetative activity, the soil is dried up near the roots of the vanilla. This is due to the special root system of the Gliricidia cuttings which is formed of about half a dozen tuberous roots which sink deeply into the ground without interfering with the roots of the vanilla. Among the other great advantages of Gliricidia props, as compared with other props, the following may be mentioned :—

1. The cuttings strike roots easily in all classes of soil, whether fully exposed to the sun or not.

2. The branches are far apart and are admirably suitable for hanging on the vanilla vines in the proper way.

3. This tree is particularly free from insect and fungus pests.

4. Many branches can be pruned several times during the year and as the tree belongs to the leguminosae family the twigs and leaves removed can be used as green manure for vanilla on the spot.

5. There are no other plants used as props which combine so powerful a growth with so little injury to the roots of the vanilla. Other leguminous plants, such as the Lucœna glauca, which is also sometimes employed as props, throw out a great number of root suckers with the result that the vanilla vines are soon choked and have to be replanted elsewhere.

VIII.

ESSENTIAL OILS AND OTHER MINOR INDUSTRIES.

The following tabulated returns show that the industry of essential oils distillation is now firmly established in the Colony. The number of stills at work and in course of erection amounts to :—

5 at Barbarons.
2 at Misère.
1 at Sans Souci.
1 at Petit Paris.
1 at Silhouette.
1 at Bel Ombre.
1 at Anse Etoile.

12

There are many other localities where this home industry could be established. The value of the exports, Rs 41,000, shows that it is by no means a negligible industry. The quantity of cinnamon bark exported is gradually vanishing, the trees barked while still standing having been killed out. Younger trees are growing again from seeds and suckers but these will take years to reach the size required to make the barking pay. Meanwhile the young trees produce every two years or 18 months a crop of leaves which is used for distillation. The enormous quantity of cinnamon leaves refuse which accumulates round distilleries is used as manure in coconut plantations. When employed in conjunction with chemical fertilizers this humus-forming material is very beneficial in the poor soils of Mahé. Astonishing results have already been obtained at Sans Souci in soils formerly rendered sterile by cassava planting and bush fires. It was noticed during a visit to Silhouette Island in November 1915 that the yield of cinnamon oil was greater than usual, viz., 15 litres per ton as compared with 8 to 10 litres in Mahé. On the island in question the distillation was carried on with small quantities of leaves at a time and the still was provided with the water bath and the continuous system of distillation the mother liquor returning automatically from the florentine vase to the still and remaining in the still for a week at a time. I think the large yield is to be attributed to the improved system of distillation rather than to particular varieties of cinnamon, although I was struck at the time of my visit by the great quantity of the small leaved variety which was being distilled.

I have also to record the presence at Praslin of a great number of cinnamon trees, at Anse Marie Louise and Fond Azor. From this centre and also from a few trees at Grand' Anse the seeds should be distributed all over the district. In 1905 several bags of seeds were sown broadcast at Fond Azor by the care of this Department but the trees at Anse Marie Louise are trees of great size and bulk. They are very old and had escaped attention for a long time.

	1912	1913	1914	1915
Cinnamon bark	Tons 1,098	765	600	193
Declared value	Rs 83,547.—	61,560.—	44,649.—	15,598.—
Cinnamon bark oil	—	—	—	lit. 9,885
Declared value	—	—	—	Rs 1,099.55
Cinnamon leaves oil	Litres 1,543	3,054	8,406	9,587
Declared value	Rs 5,071.—	11,982.75	34,790.54	37,572.30
Clove leaves oil	Litres 348	949	68	465
Declared value	Rs 1,044.—	3,796.—	314.—	2,325.—
Vetiver oil	—	—	lit. 10	—
Declared value	—	—	Rs 200.—	—
Lemon grass oil	Litres 336	139	5	77
Declared value	Rs 1,585.—	703.—	20.—	308.—
Total Exported Litres ...	Litres 2,227	4,142	8,489	20,014
Total Declared value ...	Rs 7,700.—	16,481.75	35,324.54	41,304.85
Total Exported (Cinnamon bark)..	Tons 1,098	765	600	193
Total Declared value ...	Rs 83,547.—	61,560.—	44,649.—	15,598.—

IX.

CITRATE OF LIME.

The quantity of Citrate of Lime manufactured at Silhouette (not yet exported) amounted to 1300 lbs.

Citrate of lime is made from Bigarades. The fruits are pressed in a patented machine (Couteau de la Maison Alexandre, 7 Bd Voltaire, Paris) in which they are squeezed by the action of a screw revolving slowly inside a conical piece of perforated tin. The clean juice and the pulp escape in separate directions. The juice is then placed by hand in a settling tank mixed with a little lime and allowed to stand for 12 hours. The next day it is sent to a copper cooking pan of 300 litres capacity after being sifted in a fine copper sieve. The cooking pan is placed on top of a small furnace and lime is added gradually until the juice has reached the boiling point. It is then allowed to settle and tested in order to know if sufficient lime has been added. Workers soon become experts in the work of testing by the appearance and taste of the juice. Only pure chalk (imported) is used in the process of neutralisation. The next day the mother liquor is removed by taps placed at convenient heights and the citrate of lime which has settled, is carefully washed in boiling water 3 or 4 times. The citrate is then drained in the pan itself by allowing it to remain all night in a piece of cloth. It is then dried very carefully in a special oven fitted with numerous shelves (16). Hot air from a furnace underneath is circulated round the oven by means of 6 chimneys placed along the two longest sides which measure 4 feet. After 24 hours the citrate is quite dry and is packed in barrels. It is dried a second time for a few minutes before exportation. The citrate from Silhouette Island is comparable to the best citrate of Sicily and fetches as much as £70 a ton in Marseilles. The percentage of Citric Acid reaches 66o/o as compared with 68 o/o in the Sicilian product. The owner of the factory thinks that Sicilian lemons which is skinned before being pressed gives a purer juice from which a better grade citrate is obtained. The Silhouette Citrate is however easily saleable, the minimum amount of Citric Acid required being only 58 o/o.

The necessary power for driving the presses is obtained from a petrol motor of Panard Levasseur, which consumes 400 grammes of gazoline per horse power.

These full notes are given herein in order to induce some other planters in Praslin district to make use of the large crop of bigarades which is wasted in that group of islands.

Among the crops grown for local consumption, besides bananas, I may mention palm oil and cola trees which are gradually being set out for the benefit of the Political Prisoners from the Gold Coast and Uganda. These plants which will become subspontuneous in the long run are very well adapted to the soil and climate of this Colony and will eventually produce an article of export.

X.

COIR FIBRE.

The preparation of coconut fibre for export had formerly been attempted several times in the Colony without success. It is now established on a small scale at Cascade and Anse aux Pins thanks to the persevering energy of a planter, who, without special knowledge, has succeeded in producing bristle fibre and making good ropes out of the yarn spun from mattress fibre. Only bristle fibre has been exported up to date and the quantity exported in 1915 amounted to 5 tons. It is hoped that mattress fibre will soon become an article of export.

XI.

THE RUBBER INDUSTRY.

At the beginning of 1915 the tapping of rubber trees had been discontinued and the amount of rubber exported during

the year was insignificant (kgs 285). Towards the end of the year (November) a few articles appeared in the local paper leading to show that rubber planting was a failure in this Colony. A few planters who were still tapping their trees, obligingly placed figures at my disposal which proved exactly the reverse. A series of articles were then published in the same paper in order to make good the erroneous impression which might have been conveyed to the public by the first articles of a misinformed correspondent. The result was to prove that the position of rubber was not so bad as was generally believed and that it paid much better to plant rubber on inferior soil than coconuts. It was shown that the cost of producing rubber on the estate amounted to 50 cents and that the cost of exporting to and selling in London only reached 21 cents per lb, making a total of 71 cents. Under these circumstances the nett profit per tree was reckoned at R 1.58, with rubber selling at only 2/—. The price has risen to 3/6 so that the same yield of 2 lbs per tree would now bring a profit of Rs 2.00 per tree. As rubber trees are planted at short distances, the cost of weeding and upkeep is considerably less than in the case of coconut trees which are planted 25 feet apart at least. The cost of upkeep of a coconut plantation amounts to Rs 7.60 per acre in the Colony and it is less than Rs 3.20 in a rubber plantation.

One acre of coconuts yields a profit of Rs 82.40 counting 75 trees with 30 nuts per tree to yield 2250 nuts at Rs 40 and deducting cost of upkeep of Rs 7.60.

One acre of rubber yields a profit of Rs 169.02 taking only 109 trees to the acre at 2 lbs only per tree and deducting Rs 3.20 for cost of upkeep.

The latter figures must be considered as a minimum, the number of trees per acre being 200 in the young plantations which are only 8 to 9 years old. The price realised in London is also reckoned at 2/ only, to put things at the worst.

The growth of rubber trees in Seychelles during 1915 has been far better than in the preceeding years owing to the abundant rains. The last trees growing in a plantation 12 × 12 were found to measure 42 inches girth, they were 28 inches only in March 1913, thus showing a growth of 7 inches per annum for 2 consecutive years.

There are about 184,000 rubber trees planted out in the Colony and about half of them have reached the tappable size. If they were all tapped, at least 200,000 lbs of rubber representing Rs 240,000 nett profit would be obtained. There is also no reason why new plantations should not be made as trees, even set out in the jungle without being weeded at all, have made excellent growth and reached 20 inches girth, in 8 years. All rubber trees growing in the Colony are remarkably free from disease: one scale insect only attacking it (Lecanium nigrum) but being kept under control by a natural fungus parasite (Hypocrella sp.).

I do not understand why large rubber plantations, covering hundreds of acres, are left untapped in this Colony in the present circumstances. It shows that there is something wrong in the general management of these estates perhaps. However, the few planters who have not stopped tapping, are all in a position to show to their brother planters to what extent they are mistaken.

From an agricultural standpoint it should be borne in mind that time has come for abandoning coconut planting on some estates where the numerous diseases of the palms cause them to yield only about 5 nuts per tree. It is far better to set out these estates gradually with rubber than to continue growing the palms which have occupied the same ground without manuring for over a century and whose miserable conditions of growth can only serve to establish a breeding ground for the parasitic diseases in question. This is a policy which I have recommended several times to owners of estates who are unable from any cause to keep their coconut plantations in good working order. The same policy should apply to small coconut planters in or near towns and villages, who see their crops being reduced to nothing by marauders. Rubber is not exposed to pilfering to the same extent.

XII.

FISHERIES.

The exports from the outlying Islands amounted to :—

Guano	tons	1960	Rs	58,800
Tortoise shell	kgs	444	„	12,747
Calipee	do	2632	„	5,264
Salt fish	do	34962	„	7,334
Shark fins	do	737	„	554
Trepangs	do	1937	„	625
Whale oil	hectol.	3010	„	103,636
Fish guano	kgs	94150	„	11,292

The whale oil prepared during 1914 was exported in 1915, as well as the fish guano. These two articles were lately produced by the St. Abbs Whaling Station at Ste Anne. The quantity of whale oil and whale guano exported bears testimony to the successful fishing operations of the Company which unfortunately from causes not connected with their fishing operations went bankrupt. It is hoped however that a new Company will be started in order to make use of the machinery and gear already set out. The well known Marine Biologist, Dr. W. S. Bruce, came over on behalf of the Directors of the Company to report on the fisheries and there is little doubt that ways and methods will be found by such a competent authority to establish the fisheries of Seychelles on a better basis. Hitherto, no scientific method underlaid the commercial operations and the cart was put a little before the horse. With such a vast expense of reefs between Seychelles and Mauritius which occupy about 100,000 square miles the sea resources of this Colony afford without doubt unlimited possibilities.

XIII.

CROWN LANDS.

The following plants were set out in the forest during the year :—

NIOL.

Cedars (Casuarina equisetifolia)	945
Bois de table (Heritiera littoralis)	1600
Takamaka (Calophyllum inophyllum)... ...	250
Coco plums (Chrysobolanus icaco)	1395
Anona palustris...	275
Albizzias (A. moluccana)	175
Cola (Cola nitida)	325
Tecoma (T. Leucoxylon)	1109
Gum Copal (Trachylobium verrucosum) ...	200
Gliricidia maculata	1595
Sesbania grandiflora	200
Coffee (C. robusta)	685
Palm oil (Eleis guineensis)	16
Parkia roxburghii	220
Verschaffeltia splendida	65
Palm oil new variety	450
Other palms	54
Tamarino (tamarindus indica)	40
Jobaticoba (Myrciaria cauliflora)	36
Sang dragon (Pterocarpus indicus)	225
Pahudia rhomboides	450
Citrus plants (oranges, citrons and pamplemous)	100
Grafted and other mangoes	8
Peach	25
Cloves	150

COLOMES AND DELANOS, PERARD AND MORNE BLANC.

Achras sapota	2
Avocado pears (Persea gratissima)	14
Carissa carandas	8
Chrysophyllum cainito	2
Anona squamosa	15
Jobaticoba	7
Kokia rockii	5
Macadamia ternifolia	3
Mango	17
Nephelium lappaceum	3
Citrus	106
Peach	25
Sapota nigra	1
Carica papaya	87
Eugenia jambolana	3
Ceylon bananas	3
Rubber plants	100
Clove	150
Coffee	550
Citrus plants (oranges, citrons and pamplemousses)	100
Palms new variety	50

The following are the only plants which thrive without the jungle being cleared :—

Heritiera littoralis.
Pterocarpus indicus.
Tecoma leucoxylon.
Chrysobolanus icaco.
Calophyllum inophyllum.
Cola nitidavar rubra.

All the other plants must be weeded several times a year especially under the shade of the cinnamon trees which have to be reserved. Clearings on Crown Lands Colomes, Perard and Morne Blanc are made for the planting of fruit trees. Crown Land Delanos at higher elevation is devoted to the replanting of endemic trees interplanted with Robusta coffea plants.

Capucin (Northea Seychellarum).
Bois maret (Uapaca griffithii).
Bois de fer (Vateria acunimata).
Bois de natte (Imbricaria Seychellarum) which are all on the verge of being extinct.

The Crown Lands at Praslin are all leased to the following gentlemen :—

Felicité Island to the Société des Iles Sœurs for Rs 4000 up to 22nd March 1925 and Rs 10,000 up to 22nd March 1940.

Curieuse Island to Mr H. Chenard for Rs 1500 to 30th September 1922 and Rs 2000 to 30th September 1932.

Fond Boffay to Mr d'Emmerez de Charmoy for Rs 100 to 31st August 1916, Rs 300 to 31st August 1921, Rs 400 to 31st August 1926 and Rs 500 to 31st August 1931.

Fond Azor No. 1 to Mr Gaston Morin for Rs 20 p. a. up to 31st Dec. 1917.

" No. 2 to Abdool Dawood " " "
" No. 3 to Mr Gabriel Baillon " " "
" No. 4 to Mr Loïs Gendron " " "
" No. 5 to Mr François Laporte,, " "
" No. 6 to Mr Alfred Delpech for Rs 10 p. a. up to 31st December 1917.

Anse Marie Louise to Mrs D. Collie for Rs 700 to 7th December 1923 and renewable for 10 years to 8th December 1933.

Fond Ferdinand to Mr L. Pouponneau at Rs 200 expiring on 6th March 1924.

Pointe Zanguilles to Mr. R. Dubignon Rs 50 to 31st November 1914 and Rs 100 to 30th November 1921.

Pointe Chevalier to Mr. d'Emmerez Rs. 50 first 10 years, Rs 75 second 10 years and Rs. 150 last 10 years.

Anse Georgette and Anse Kerlan to Mr. Emile Adam Rs. 100 p.a. to 31st December 1929.

Newcome to Mr. François Hoareau Rs. 55 to 19th December 1921 Rs. 75 to 19th December 1924 and Rs 100 to 19th December 1930.

Savoie to Mr. Abel Adam Rs. 65 p.a. to 31st July 1924.

Booby Island Praslin to Mr. Georges Barallon Rs. 10 to 30th June 1919.

Crown Land near Fond Azor to Antoine Jacqueline Rs. 10 to 31st August 1918.

Felicité and Curieuse are very fine Islands which yield together about 60,000 nuts a month. These islands being very productive they are looked after by the lessees better than most of the other Crown Lands which are nearly all estates abandoned by their former owners.

XIV.

INSECTS NOTES.

The green scale (Lecanium viride) continues its depredations in the low country but it is kept in check on the hills by a fungus parasite (Cephalosporium lecanii). It is wonderful to see how this useful parasite has freed the coffee bushes on the hills from lecanium viride scales. Alongside Misère road and in many other localities above 800 feet elevation, the coffee bushes which were seen to be dying out gradually have suddenly escaped from destruction to the great surprise of most people. The scale insects are not visible to the passers-by who would soon find out the reason of the recovery of the coffee bushes if they would examine closely the stems and leaves along side which the scale insects become the prey of a sort of mould clearly visible to the naked eye.

This fungus parasite has also been found attacking lecanium tessellatum on cinnamon and coconut palms in the low country owing to the constant rainy weather we have been having for the last 3 years. The obscure work of these parasites cannot be too much emphasised. Great care should be exercised in not destroying these friendly organisms when it is decided to clean by bush fires (a calamitous method) a coconut plantation or a cinnamon jungle.

The disappearance of many scale insects and the restoration to health of many plants have led many people to imagine that the ants which live in association with scale insects have also disappeared from many localities owing to a controlling parasite. I have never seen ants (Technomyrmex albipes) more active than at present in most localities. If they are less numerous in certain places, it is simply because scale insects having been destroyed by fungus parasites they find a reduction in those places, of their favourite food which is precisely the excretion of scale insects. A controlling parasite would have been more efficient.

While certain persons believe that ants disappear, others have no hesitation in saying that they are responsible for the reduction in the coconut crop for 1915 because they prevent pollination. This belief is not supported by facts. Petch in Ceylon has proved that the small black ants (Technomyrmex) are unable to approach the stigmas of the female flowers during the short time (24 hours) they remain receptive owing to a water syrup which oozes out round the stigmas. The ants are sometimes found to feed on the circle of syrup which keeps them outside the reach of the stigmas. Ants are seldom found in Seychelles on the flowers of coconut trees, except those which are infested with scale insects. From want of better knowledge they have been incriminated as having caused the reduction of the crop 1915 which is mostly due to exhaustion of unmanured trees following heavy crops.

Another scale insect which does great mischief in young coconut plantations is aspidiotus ficus. Older trees are sometimes severely attacked in certain seasons but in others these insects seem to be kept under control by parasites. In a parasite rearing cage, I have been able to obtain a few minute insects which emerged from Aspidiotus ficus scales and these minute parasites, hardly visible to the naked eye, have been sent home for identification and advice.

A great number of boring and grain beetles have been kindly identified by the Imperial Bureau of Entomology during the year under review. The following list is recorded :—

Scolytidæ.

1. Xyleborus perforans, Woll.—This insect was found for the first time attacking coconuts at La Digue. Nuts suffering from a fungus disease were found to have cracked longitudinally just before maturity and to have harboured the boring beetle in question. Only three coconut palms were found to bear nuts attacked by the beetle and the three trees were destroyed and burnt.

2. Crassotarsus externedentatus, Fairn.—Was found attacking Pterocarpus indicus (Sangdragon) branches. The attacks of this insect are secondary only, the branches of Sangdragon have first to be cut down before they are attacked.

3. Xyleborus semigranosus Blandf.—Attacks cinnamon, albizzia lebbek and Eugenia jambos; secondary attacks only. These insects are so numerous in Seychelles that cinnamon bushes which are peeled for their bark are attacked a few days after they are cut down even at a distance of several miles from infested localities.

4. Xyleborus abruptus samp.—Attacks Cashew (Anacardia), Albizzia lebbek and Eugenia jambos and is known only from Seychelles where it is very common; secondary attacks only.

5. Ecoptopterus sexspinosus, Mots.—Attacks Eugenia jambos. This tree which was so common formerly in Seychelles is suffering heavily from attacks of the boring beetles in question. It is an insect known as a pest of rice plants in Burma.

Crassotarsus externedentatus, Fairn was also found attacking stems, twigs and boughs of ficus nautarum newly cut down. The adult insects work its way inward from the underside portion of the stem or bough lying on the ground in a damp place. The attack begins a fortnight after the branches have been cut down, when no more latex runs out and the tissue is sufficiently decomposed. On the upper side of the stem no attack is made at the time, the latex being present a month after date of cutting. The eggs of the insects are laid in clusters and not singly as in other cases. A greater number of larvæ were found close to the pith of the wood. Left on top of a boulder in dry season and exposed to the sun, branches of ficus nautarum are not attacked. Wood cutters are inclined to believe that the beetles do more havoc at the time of full moon and for this reason they avoid felling any trees until that period is over.

Bostrychydæ Tenebrionidae & Curculionidae.

6. Dinoderus biforeolatus, Woll.—Attacks bamboos of all kinds except dendrocalamus gigantea (Giant bamboo). Is also a grain beetle and attacks flour. Dr Guy Marshall remarks that its habits are probably as varied as those of the very nearly allied D. minutus which has been recorded from bamboos.

7. Rhizonertha dominica F.—Attacking lentils. Tenebrionidae.

8. Tribolium castaneum Hbst.—Attacking lentils. Curculionidae.

9. Calandra orizæ.—Attacking rice and maize.

10. Discalandra formenti F. (Calandra stigmaticollis Cyll).—Attacking green coconut leafstalks at La Digue.

A great quantity of grain mostly rice and maize is lost in the Colony without any attempt being made at disinfecting them with carbon bisulphide or sulphur fumes or hydrocyanic acid gas in order to destroy the beetles. It is not known generally that 1 lb of carbon bisulphide is sufficient for the treatment of one ton of grain contained in air tight boxes or chambers. The grains are not to be exposed for more than 36 hours. The germinative power and the industrial value of the grain is impaired when the action of the gas is too prolonged. Mr D. D'Emmerez de Charmoy, Entomologist, Mauritius, has advised treating heaped grains by carbon bisulphide in the following way. To introduce the fluid into the heap, a rod is fixed loosely into an ordinary pipe or bamboo and pushed down into the heap, the rod is then withdrawn and the liquid poured into the pipe or bamboo stick.

The study of boring and grain beetles has also been started this year in order to avoid possible introductions in the future of insects which are likely to become injurious to cinnamon, coconut and other plantations.

The following list of scale insects aphids has also been kindly identified by Mr E. E. Green, the well-known entomologist during the year :—

1. Gymnaspis grandis. nov. sp. on coco de mer husks.
2. Ischnaspis filiformis, Douglas, on palm oil leaves, coconut and coffee leaves.
3. Aspidiotus dictyospermi, Morg,—On Jasminum, Thumbergia grandiflora Pandanus utilis and on coconut leaf bases.
4. Aspidiotus lataniae sign.—On coconut leaf bases and thumbergia grandiflora and on fruits of bitter and bergamotte oranges.
5. Aspidiotus trilobitiformis on Beaumontia grandiflora.
6. Perlatoria pergandei, Comstock, on Thumbergia grandiflora.
7. Pulvinaria antigoni, Green, on Latana camara and Melia Azedarichta.
8. Hemichionaspis aspidistræ on Areca nut leaves, on Dracœna sp. and on Pandanus utilis.
9. Cerataphis lataniæ on vanilla leaves, seems like all other Aphids to be doing much less damage than scale insects in the Colony.
10. Mytilaspis sp. nov. on coconut leaf bases at Silhouette.
11. Aspidiotus ansei sp. nov. on coconut leaves at Anse aux Pins.

From the above list it can be seen that no less than four scale insects were found to be attacking coconut leaves and two of these were insects new to Science and occurring only in Seychelles.

XV.

The principal plants and seeds sold were the following :—

Eleis guineensis (Palm oil).
Parkia Roxburghii.
Dendrocalamus gigantea (Giant bamboo).
Coffea Quillœr.
„ excelsa.
„ congensis.
„ canephora.
„ robusta.
Mentha piperita (Peppermint).
Gliricidia maculata.
Citrus Aurantium (Oranges).
„ nobilis (Mandarin Oranges).
„ decumane (Pamplemousses).
Jaboticoba (Myrciaria cauliflora).
Anona squamosa (Sweet soap).
„ reticulata (Custard apple).
Saccharum officinarum (Sugar cane from seedlings).
Vanilla planifolia (cuttings).
Casuarina equisetifolia.

A large variety of ornamental plants with striking flowers such as :—

Allamanda grandiflora.
Bougainvillea laterita.
Plumeria rubra. (Red Frangipane).
Malpighia coccinea.
Poinsettia pulcherzima.
Porana volubilis.
Quisqualis indicus.

Cinnamon bark and leaves to the value of Rs 88.91 were also sold from the lower parts of Niol Forest, below the reservoir, to a neighbouring distiller of essential oils.

P. R. DUPONT,
Curator Botanic Station.

February 1916.